Region 2 (Southwest Region) FY 2012 Annual Work Plan

1. Introduction

1.1. Vision: The Southwest region's Inventory and Monitoring (I&M) program coordinates and standardizes inventory and monitoring data collected on National Wildlife Refuges (Refuges) and landscapes in the Southwest. Our regional I&M program integrates with the US Fish and Wildlife Service National I&M initiative, Landscape Conservation Cooperatives (LCCs) and other agencies. Conservation and management of natural resources is an interdisciplinary endeavor. Therefore, we strive to integrate via staffing and funding, Biological Sciences, Fire Management, and Water Resources Divisions into a natural resource program that leverages shared I&M priorities. The I&M program supports projects which improves our ability to address conservation and management information needs relevant to species, habitats, and landscapes on and off Refuges in the Southwest.

1.2. Goals

- Ensuring success of the National Wildlife Refuge System I&M initiative
- Assist the National Office with implementing I&M priorities
- Assist Refuges with improving their ability to monitor and assess results of management actions
- Strengthen the impact of data collection and stewardship
- Assist with developing project design, implementation, data analyses, and reporting
- Develop, where needed, protocols and databases for inventory and monitoring of fish, wildlife, plants and habitat across the Refuge system
- Monitor fish, wildlife, plants, and habitat using repeatable and scientifically sound techniques across the Refuge system

1.3 Objectives for FY12

- PRIMR database data input and ranking by Refuges for inventory, monitoring and research completed by 30 November 2011.
- Continue with ongoing inventory and monitoring projects including drinker monitoring, ocelot (*Leopardus pardalis*) monitoring, and unmarked animal inventory and density estimation.
- Complete final reports for Masked bobwhite (*Colinus virginianus ridgwayi*) grassland inventory, Masked bobwhite genetics work.
- Complete plan to integrate Refuge-centric and large-scale waterfowl survey efforts.
- Working through an interagency agreement to fund collaborative projects, the National Park Service and Refuge I&M programs aim to integrate efforts on projects in the Sonoran Desert, Chihuahuan Desert and Southern Plains. The collaboration will span multiple levels of program development and implementation.

1.3. Organization and Focus Areas

Southwest Region Office I&M staff include an I&M Coordinator, Data Manager, four Hydrologists, one Fire Ecologist, one Fire Geospatial Ecologist, one Remote Sensing/Botanist, one Spatial Ecologist, two Landscape Ecologists, one Migratory Bird Specialist, and one Biometrician. Field-based staff (five Zone Biologists and two Land Management Research Demonstration Biologists) are strategically located throughout the region. Each Zone Biologist is responsible for addressing the I&M needs of Refuges in their areas as well as coordinating with the LCCs, other US Fish and Wildlife Service programs and organizations, and other agencies.

1.4. Integration with the Regional Refuge Biological Program

Cooperation with Fire Management, Migratory birds, and Water Resources was instrumental to accomplished previous fiscal year work with I&M as the bridge between disciplines. This cooperative approach will continue in 2012 and beyond.

1.5. Coordination with other regional FWS programs

I&M supported projects such as the Sonoran Pronghorn Species recovery efforts and the inventory and evaluation of playas involve cooperation with US Fish and Wildlife Service programs, LCCs, state and local agencies, Joint Ventures, Friends Groups and non-government organizations. For a complete list of projects, see 'Planned Activities and Anticipated Products ' section below. The vision, goals, and objectives for the Southwest I&M program overlap with those of the LCCs. Six LCCs occur in the Southwest Region, and an I&M Zone Biologist attends to each. These six LCCs include Desert, Southern Rockies, Great Plains, Gulf Coastal Plains and Ozarks, Eastern Tallgrass Prairie and Big Rivers, and Gulf Coast Prairie. Our I&M program collaborates with the LCCs, and serves on the Science Advisory Team for the Great Plains LCC. The Southwest Region is identifying and cataloging I&M and biological projects conducted by US Fish and Wildlife Service and partners on Refuges and in neighboring landscapes. To foster conservation and management outcomes, this cataloging will increase our ability to identify shared priorities and build greater correspondence between projects spanning multiple agencies.

2. Staffing

2.1. **Regional Office Staff:**

Biological Sciences:
Grant Harris - Chief of Biological Services/Landscape Ecologist
Cinthia Eichhorn - Data Manager
Kris Metzger – Regional I&M Program Coordinator/Landscape Ecologist
Greg Hughes – Integrated Pest Management, PUPs, I&M Program Co-Coordinator
Matthew Butler - Biometrician
Steve Sesnie - Spatial Ecologist
David Lindsey – Botanist/GIS specialist
Water Resources:
Paul Tashjian - Hydrologist
Peter Burke - Hydrologist
Andrew Hautzinger - Hydrologist
Darrel Kundargi – Hydrologist
Fire Management:
Mark Kaib - Fire Ecologist
Kari Gromatzky - Geospatial Scientist

Field-based staff:

Brenda Zaun - Zone Biologist, Lower Colorado River, Southwest AZ National Wildlife Refuge (NWR) Complex
Lacrecia Johnson - Zone Biologist, Sonoran and Chihuahua Deserts, co-located with National Park Service – Tucson, AZ
John Vradenberg - Land Management and Research Demonstration (LMRD) biologist, Bosque del Apache NWR
Jim Mueller - LMRD, Balcones NWR

Bill Ostrand - Zone Biologist, TX Gulf Coast, TX Midcoast Complex
Bill Johnson - Zone Biologist, Western OK, West TX, and Eastern NM, located at West Texas A&M University in Canyon, TX
Paige Schmidt - Zone Biologist, Eastern OK, co-located with Tulsa, OK- Ecological Services
Pilot/Biologist – Vacant
18 Student Conservation Association interns
Zone biologist zones and LCCs covered see map:
http://sharepoint.fws.net/Programs/nwrs/IM/R2/Maps/General%20Reference/11-010_General_Ref_Maps_ZB_LCCs_20110407.pdf

3. Planned Activities and Anticipated Products

3.1. Identify I&M priorities for Refuges and the region.
- 3.1.1. Status of Refuge Habitat Management Plans
  - 3.1.1.1. Determine status of Habitat Management Plans on Regional Office server.
- 3.1.2. Status of Refuges Inventory and Monitoring Plans
  - 3.1.2.1. Refuges submit PRIMR database and Refuge survey ranking to Regional Office.
  - 3.1.2.2. Initial results reviewed by Zone Biologists, Refuges, and Regional Office staff.
  - 3.1.2.3. Results summarized.
  - 3.1.2.4. Zone Biologists, regional, and Refuge staff determine which I&M enter protocol development - end of phase I.
- 3.1.3. Summary of inventory, monitoring and research priorities for the region
  - 3.1.3.1. Develop protocols.

3.2. Abiotic Resources
- 3.2.1. Inventories
  - 3.2.1.1. Establish priorities for new Hydrogeomorphic (HGM) evaluation and Wetland Reviews.
  - 3.2.1.2. Complete Sequoyah and Aransas NWR HGMs.
  - 3.2.1.3. Complete Lower Rio Grande Valley NWR Wetland Review; assemble abiotic baseline data sets for NWR System managers, South Texas Complex abiotic data package
  - 3.2.1.4. Initiate population of Water Resource Inventory Area (WRIA) database.
  - 3.2.1.5. Initiate WRIA for Muleshoe NWR.
  - 3.2.1.6. Complete inventory and quantitative assessment of seeps, springs, or tinajas within NPS lands and FWS Refuges occurring in the Sonora and Chihuahua deserts through continued collaboration with Chihuahua Desert Network/National Park Service via staff and data sharing.
- 3.2.2. Monitoring
  - 3.2.2.1. Implement monitoring practices that will allow for effective monitoring of changes in ground water with respect to rainfall and irrigation usages, and better understand the effect of ground water fluctuations.

3.3. Biotic Resources
- 3.3.1. Inventories
  - 3.3.1.1. Ongoing inventory project at Bosque del Apache NWR designed to evaluate the utility of camera-trapping to estimate density of unmarked animals.

3.3.1.2. Complete final report on inventory and status of subtropical grasslands for Masked bobwhites in Sonora, Mexico. Two sites receiving further ground reconnaissance in 2012.

3.3.1.3. Complete final report on inventory and status of native grasslands for Sonoran pronghorn (*Antilocapra americana sonoriensis*) in CA and AZ.

3.3.1.4. Produce vegetation/habitat/invasive species maps at Aransas NWR.

3.3.1.5. Complete final report describing inventory and evaluation of genetics of five subspecies of *C. virginianus*, including the Masked bobwhite.

3.3.1.6. Map the remaining habitat of the Golden-cheeked warbler (*Dendroica chrysoparia)* across its entire range.

3.3.2. Monitoring

3.3.2.1. Continue project with Rocky Mountain Bird Observatory to conduct Muleshoe grassland bird surveys.

3.3.2.2. Complete report and database for FY11 black-tailed prairie dog monitoring efforts at Buffalo Lake NWR, Maxwell NWR, and Muleshoe NWR.

3.3.2.3. Implement *Pecos assiminea* monitoring at Bitter Lake NWR.

3.3.2.4. Complete development of a robust monitoring technique for overwintering whooping cranes (*Grus americana*) on the Texas Gulf Coast.

3.3.2.5. Final report completed of bat monitoring in Ozark Plateau NWR.

3.3.2.6. Continue project evaluating the use of molted golden eagle feathers collected at nest sites to estimate turnover rates (and by inference, survival rates) of adult eagles.

3.3.2.7. Determination of unionid mussel dispersal through host fish movement and juvenile drift on the Little River NWR.

3.3.2.8. Initiate camera trapping to monitor presence, movement, and dispersal of Ocelots in Southern TX.

3.3.2.9. Develop a robust and defensible survey for desert bighorn sheep (*Ovis canadensis mexicana*) at San Andres NWR.

3.3.2.10. Finalize analysis of long-term overwinter bird banding data from San Bernard NWR. Estimate overwinter survival probabilities of migrant passerines and determine prevalence of transient individuals. Evaluate efficacy of current techniques and provide recommendations for improvement.

3.3.2.11. Identify current surveys which may be suitable for phenological monitoring applications via PRIMR results.

3.3.3. Fire

3.3.3.1. Develop fire monitoring plans for the New Mexico Fire District Refuges.

3.3.3.2. Complete Fire Atlas project in the region.

3.3.3.3. Assess fire monitoring data collected at Buenos Aires NWR to determine if the current fire plan needs revising.

3.3.3.4. Continue development of Flooding Atlas; mapping flood events and extent of inland water related to hurricane severity along the Texas Gulf Coast.

3.3.3.5. Study fine fuels detection and modeling in the Sonoran Desert using phenology based techniques and time series data aimed at developing methods for estimating fine fuel production that are potentially transferable to other arid lands. The work targets

the contribution of non-native plants to herbaceous fuel production which has both a phenology and climate change component to it.

3.3.4. Climate Change

3.3.4.1. Finalize analysis of long term whooping crane population dynamics; examine potential relationships between 10-year cycle in population growth rates and climatic cycles; forecast whooping crane population trajectory; evaluate potential impacts of sustained declines in growth rate due to long-term drought.

3.3.5. Invasive Species

3.3.5.1. Inventory and monitoring of invasive species on Refuge lands by building a geodatabase that captures maps of current distribution and extent where and when treatment occurred, type of treatment, and monitoring of treatment effectiveness. Geodatabase structure complete by 1 June 2012.

3.3.5.2. Complete McArtney Rose invasive species map for Attwater Prairie Chicken NWR.

3.3.5.3. Complete invasive species inventory and map at Deep Fork NWR.

3.4. Adaptive Management Projects

3.4.1. Studying climate change and invasive plant species impacts on Sonoran desert ecosystems and changing fire regimes in areas overlapping with Cabeza Prieta and Kofa NWRs, NPS and Department of Defense land. This project involves inventory and monitoring of invasive species fine fuel biomass and developing models of plant invasion risk that will take into account disturbance and land use factors. A decision support tool will be developed with this project.

3.4.2. Inventory and monitoring of wildlife drinkers. Year two of three. Camera traps set at artificial drinkers and natural springs in the Mojave, Sonora and Chihuahua deserts to evaluate patterns of use by desert bighorn sheep and mountain lions (using 65 cameras). Understanding patterns of use helps management refine water placement and availability to target wildlife and discourage use by non-target species.

3.4.3. Continued monitoring of farming practices at Bosque del Apache NWR. Year two of four**.** Using a combinations of traditional farming techniques, heirloom crops, composite planting, and conventional farming to design methods for increasing crop yield for waterfowl with minimal pesticide, or genetically-modified organism use.

3.4.4. Complete survey plan which provides defensible estimates of annual food production and habitat use by waterfowl. Plan includes designing methods to capture ground data describing vegetation type, structure and composition at the sites where aerial waterfowl counts occur. We will relate survey data to habitat conditions (i.e. food production and the timing and distribution of available habitat) to determine their relationship.

3.5. Data Management

3.5.1. Complete the Aransas NWR Geodatabase Referencing Archive System (GRAS) pilot.

3.5.2. Based on PRIMR rankings, develop data management plans for the approved protocols.

3.5.3. Data management plan for camera trapping images.

3.5.4. Collaboration with NPS network data managers to coordinate FWS and NPS databases.

3.5.5. Establish a server for the integrative Natural Resource Program.

3.6. Communication (examples: symposia, program reviews, training, workshops, partnerships)

3.6.1. Fire Ecology Conference in Southwest Region February 2012. Entitled “Fire Landscapes, Wildlife and People: Building Alliances for Restoring Ecosystem Resilience”.
3.6.2. Presentation to Texas Hill Country Master Naturalists on range management.
3.6.3. Pursue partnership with Oklahoma State University to involve students in grassland bird surveys at Muleshoe NWR through a "special topics" course. The students would get both course credit and experience.
3.6.4. Assist in development of Oaks and Prairies Joint Venture Grassland Conservation Plan.
3.6.5. Tularossa Basin I&M partnership with National Park Service

Table 1. Region X Inventory and Monitoring Activities, by Project or Theme

Blueprint Objectives and Tasks	Project or Theme; Status	Planned Product	Staff
	ABIOTIC RESOURCES - INVENTORIES		
2A	*Water Resource Inventory and Assessment (WRIA)* Initiate population of national database, WRIA ongoing	WRIA initiated for 10 stations.	Paul Tashjian, Peter Burke
1B	*HGM: Sequoyah and Aransas initiated*	HGMs initiated for 2 Refuges, complete for 6	Paul Tashjian
1B	*Wetland Review for Lower Rio Grande Valley NWR*	Wetland review initiated for 1 Refuge	Paul Tashjian
1A	Complete inventory and quantitative assessment of seeps, springs, or tinajas within NPS lands and FWS Refuges occurring in the Sonora and Chihuahua deserts through continued collaboration with Chihuahua Desert Network/National Park Service via staff and data sharing.	Inventory is ongoing on x Refuges in the Sonoran and Chihuahua desert	Lacrecia Johnson, Brenda Zaun
	ABIOTIC RESOURCES - MONITORING		
2A	Storing of changes in ground water with respect to rainfall and irrigation usages, and better understand the effect of ground water fluctuations	Monitoring is occurring on50 shallow ground water wells located across 6 Refuges.	Darrel Kundargi
	BIOTIC RESOURCES - INVENTORY		
1D	Ongoing inventory project at Bosque del Apache NWR designed to evaluate the utility of camera-trapping to estimate density of unmarked animals.	Monitoring is occurring on50 shallow ground water wells located across 6 Refuges.	Darrel Kundargi
1D	Complete final report on inventory and status of subtropical grasslands for Masked bobwhites in Sonora, Mexico. Two sites receiving further ground reconnaissance in 2012	Final Report	Grant Harris, Lacrecia Johnson
1D	Complete final report on inventory and status of native grasslands for Sonoran pronghorn (*Antilocapra americana sonoriensis*) in CA and AZ	Final Report	Grant Harris, Lacrecia Johnson
1D	Produce vegetation/habitat/invasive species maps at Aransas NWR	Vegetation/invasive species map	David Lindsey
1D	Complete final report describing inventory and evaluation of genetics of five subspecies of *C. virginianus*, including the Masked bobwhite	Final Report	Grant Harris, Lacrecia Johnson
1D	Map the remaining habitat of the Golden-cheeked warbler (*Dendroica chrysoparia)* across its entire range	Habitat map	Jim Mueller, Steve Sesnie
	BIOTIC RESOURCES - INVENTORY		
1D	Continue project with Rocky Mountain Bird Observatory to conduct Muleshoe grassland bird surveys	Monitoring at Muleshoe	Bill Johnson
1D	Complete report and database for FY11 black-tailed prairie dog monitoring efforts at Buffalo Lake NWR, Maxwell NWR, and Muleshoe NWR	Final report, database	Bill Johnson

Blueprint Objectives and Tasks	Project or Theme; Status	Planned Product	Staff
1D	Implement *Pecos assiminea* monitoring at Bitter Lake NWR	Monitoring	Bill Johnson
1D	Complete development of a robust monitoring technique for overwintering whooping cranes (*Grus americana*) on the Texas Gulf Coast	Monitoring technique defined	Matthew Butler
1D	Final report completed of bat monitoring in Ozark Plateau NWR	Final Report	Paige Schmidt
1D	Continue project evaluating the use of molted golden eagle feathers collected at nest sites to estimate turnover rates (and by inference, survival rates) of adult eagles	Ongoing	Brian Milsap
1D	Determination of unionid mussel dispersal through host fish movement and juvenile drift on the Little River NWR		BVrenda Zaun
1D	Initiate camera trapping to monitor presence, movement, and dispersal of Ocelots in Southern TX	Monitoring	Grant Harris. Refuges, SCA
1D	Develop a robust and defensible survey for desert bighorn sheep (*Ovis canadensis mexicana*) at San Andres NWR	Survey technique	Grant Harris, Matt Butler
1D	Finalize analysis of long-term overwinter bird banding data from San Bernard NWR. Estimate overwinter survival probabilities of migrant passerines and determine prevalence of transient individuals. Evaluate efficacy of current techniques and provide recommendations for improvement	Data analysis	Paige Schmidt
General Task C	Identify current surveys which may be suitable for phenological monitoring applications via PRIMR	Phenological evaluation of data	Kris Metzger
	STRESSORS PROJECTS		
2B	Develop fire monitoring plans for the New Mexico Fire District Refuges	Fire monitoring plan	Mark Kaib, SCA
2B	Complete Fire Atlas project in the region	Fire Atlas	Mark Kaib, SCA
2B	Assess fire monitoring data collected at Buenos Aires NWR to determine if the current fire plan needs revising	Re-evaluation of fire plan	Mark Kaib, SCA
2B	Study fine fuels detection and modeling in the Sonoran Desert using phenology based techniques and time series data, that is aimed at developing methods for estimating fine fuel production that are potentially transferable to other arid lands. The work targets the contribution of non-native plants to herbaceous fuel production which has both a phenology and climate change component to it	Study ongoing	Steve Sesnie

Blueprint Objectives and Tasks	Project or Theme; Status	Planned Product	Staff
2B	Continue development of Flooding Atlas; mapping flood events and extent of inland water related to hurricane severity along the Texas Gulf Coast	Flooding Atlas	Bill Ostrand
	CLIMATE CHANGE PROJECTS		
1D	Finalize analysis of long term whooping crane population dynamics; examine potential relationships between 10-year cycle in population growth rates and climatic cycles; forecast whooping crane population trajectory; evaluate potential impacts of sustained declines in growth rate due to long-term drought	Finalize analysis	Matt Butler
	INVASIVE SPECIES PROJECTS		
3A	Inventory and monitoring of invasive species on Refuge lands by building a geodatabase that captures maps of current distribution and extent where treatment occurred, type of treatment, when treatment occurred and monitoring of effectiveness of that treatment. Geodatabase structure complete by 1 June 2012	Geodatabase of invasive species on refuge lands	Dave Lindsey
3A	Complete McArtney Rose invasive species map for Attwater Prairie Chicken NWR	Invasive species map	Dave Lindsey
3A	Complete invasive species inventory and map at Deep Fork NWR	Invasive species map	Dave Lindsey
	ADAPTIVE MANAGEMENT PROJECTS		
1F, 3A	Studying climate change and invasive plant species impacts on Sonoran desert ecosystems and changing fire regimes in areas overlapping with Cabeza Prieta and Kofa NWRs, NPS and Department of Defense land. This project involves inventory and monitoring of invasive species fine fuel biomass and developing models of plant invasion risk that will take into account disturbance and land use factors. A decision support tool will be developed with this project	Decision support tool	Steve Sesnie
1F	Inventory and monitoring of wildlife drinkers, year two of three: Camera traps set at artificial drinkers and natural springs in the Mojave, Sonora and Chihuahua deserts to evaluate patterns of use by desert bighorn sheep and mountain lions (using 65 cameras). Understanding patterns of use helps management refine water placement and availability to target wildlife and discourage use by non-target species	Monitoring	Grant Harris, Lacrecia Johnson, Matt Butler

Blueprint Objectives and Tasks	Project or Theme; Status	Planned Product	Staff
1F	Continued monitoring of farming practices at Bosque del Apache NWR. Year two of four**.** Using a combinations of traditional farming techniques, heirloom crops, composite planting, and conventional farming to design methods for increasing crop yield for waterfowl with minimal pesticide, or genetically-modified organism use	Monitoring of farming practices	John Vradenburg
1F	Complete survey plan which provides defensible estimates of annual food production and habitat use by waterfowl. Plan includes designing methods to capture ground data describing vegetation type, structure and composition at the sites where aerial waterfowl counts occur. We will relate survey data to habitat conditions (i.e. food production and the timing and distribution of available habitat) to determine their relationship	Survey plan of waterfowl	All I&M team, Grant Harris
	DATA MANAGEMENT		
General Task A	PRIMR surveys filled out and ranked by Refuges due Nov 30, 2011	PRIMR completion	I&M team, Refuges
1C	Complete the Aransas NWR Geodatabase Referencing Archive System (GRAS) pilot		Cinthia Eichhorn, Greg Hughes, Refuges
General Task A	Based on PRIMR rankings, develop data management plans for the approved protocols		I&M team
1D	Data management plan for camera trapping images		Cinthia Eichhorn
General Task C	Collaboration with NPS network data managers to coordinate FWS and NPS databases		Cinthia Eichhorn
	Establish a server for the integrative Natural Resource Program		Cinthia Eichhorn, Steve Sesnie
	COMMUNICATION		
General Task C	Fire Ecology Conference in Southwest Region February 2012. Entitled “Fire Landscapes, Wildlife and People: Building Alliances for Restoring Ecosystem Resilience”		Mark Kaib
General Task C	Presentation to Texas Hill Country Master Naturalists on range management		Jim Mueller
General Task C	Pursue partnership with Oklahoma State University to involve students in grassland bird surveys at Muleshoe NWR through a "special topics" course. The students would get both course credit and experience		Bill Johnson

General Task C	Assist in development of Oaks and Prairies Joint Venture Grassland Conservation Plan		Bill Johnson
General Task C	Member of the Great Plains Science Advisory Committee		Bill Johnson
General Task C	Members of Climate Change Vulnerability Assessment for the Desert LCC		Lacrecia Johnson, Brenda Zaun

1. **Budget Narrative and Budget**
   1.1. Of the $1,596,610 of I&M funding, $550,000 will be spent on salaries and $962,000 for contracts to support I&M operations on refuges. An additional $84,610 on travel, vehicles, and support costs.

2. **Appendix**
   2.1. List of NWRS stations in the region, by state and LCC.
      2.1.1. See Maps:
         2.1.1.1. Arizona:
            http://sharepoint.fws.net/Programs/nwrs/IM/R2/Maps/General%20Reference/11-010_General_Ref_Maps_ZB_LCCs_AZ_nc_20110328.pdf
         2.1.1.2. New Mexico:
            http://sharepoint.fws.net/Programs/nwrs/IM/R2/Maps/General%20Reference/11-010_General_Ref_Maps_ZB_LCCs_nm_20110407.pdf
         2.1.1.3. Oklahoma and Northern Texas:
            http://sharepoint.fws.net/Programs/nwrs/IM/R2/Maps/General%20Reference/11-010_General_Ref_Maps_ZB_LCCs_OK_20110404.pdf
         2.1.1.4. SE Texas:
            http://sharepoint.fws.net/Programs/nwrs/IM/R2/Maps/General%20Reference/11-010_General_Ref_Maps_ZB_LCCs_seTX_20110404.pdf